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We do not wish, however, to elaborate the connection of logical systems with the problem of types. We wish merely to point out that logical systems exist, and that all logic and all science are necessarily examples of them, and also to point out that no purely extensional logic can account for the existence of logical systems or their properties, thus placing extensional logic in the uncomfortable position of not being able to account for the very characteristic, namely, that theorem unambiguously follows from postulate, which makes it a science at all.

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### NOTE ON THE RELATION OF SUBALTERNATION

IN a recent article in this JOURNAL (*Non-Aristotelian Logic*, August 15, 1918), in which a generalization of the classical logic was proposed, the relations of subalternation were tacitly held to be true.

This feature of the science being all but universally denied in recent times,<sup>1</sup> it was not unnatural that a number of critics should have privately informed the writer that this assumption invalidated some of his results.<sup>2</sup>

Thus, if we employ the symbol,  $\angle$ , for *inclusion*, the four categorical forms, A, E, I, O, might supposedly be represented as follows ( $b'$  standing for non- $b$ ; the "prime" to the right of the bracket indicating that the proposition is *false*):

- (A) All  $a$  is  $b = (a \angle b)$
- (E) No  $a$  is  $b = (a \angle b')$
- (I) Some  $a$  is  $b = (a \angle b')'$
- (O) Some  $a$  is not  $b = (a \angle b)'$

<sup>1</sup> Cf. Couturat (*Des propositions particulières*, *Revue de Métaphysique et de Morale*, t. XXI., p. 258).

"Du moment que les particulières sont des existentielles négatives, on ne peut pas déduire une particulière d'une universelle (ni inversement). Donc la subalternation classique est fautive. De: «Il n'y a pas de  $a$  non- $b$ » on ne peut nullement inférer: «Il y a des  $ab$ ». Cette inférence n'a pu faire illusion que grâce à la prémisse additionnelle et tacite: «Il y a des  $a$ », qui semblait impliquée dans le langage."

Couturat in the same article (p. 257) attaches the following meaning to A, E, I and O:

- (E) Nul  $a$  n'est  $b =$  Il n'y a pas de  $ab$ .
- (A) Tout  $a$  est  $b =$  Il n'y a pas de  $a$  non- $b$ .
- (I) Quelque  $a$  est  $b =$  Il y a des  $ab$ .
- (O) Quelque  $a$  n'est pas  $b =$  Il y a des  $a$  non- $b$ .

<sup>2</sup> It was this misapprehension, which the original article ought to have removed; but what follows will serve to present the matter from another point of view.

Here A is the contradictory of O and E the contradictory of I, but it no longer holds true that

A *implies* I,  
E *implies* O.

We wish to point out that this interpretation of Aristotle's four forms is in no way forced upon us, for we may assume:<sup>3</sup>

- (A) All  $a$  is  $b = (a \angle b)$
- (E) No  $a$  is  $b = (a \angle b') \ (a \angle a')' \ (b \angle b')'$
- (I) Some  $a$  is  $b = (a \angle b')' + (a \angle a') + (b \angle b')$
- (O) Some  $a$  is not  $b = (a \angle b)'$

(the symbol, +, standing for *either, or*; the multiplication symbol for *and*).

From these results we obtain  $AE \angle 0$ , which contains

A *implies* I,  
E *implies* O,

since A remains the contradictory of O and E the contradictory of I.

It should be remarked too that A and I become *true* propositions, when subject and predicate have been identified, whereas E and O become *false* under the same circumstances. Thus,

$$\begin{aligned}\text{Some } a \text{ is } a &= (a \angle a')' + (a \angle a') = 1 \\ \text{No } a \text{ is } a &= (a \angle a') \ (a \angle a')' = 0\end{aligned}$$

Finally, it will be observed that E and I retain their characteristic property of simple convertibility.

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## REVIEWS AND ABSTRACTS OF LITERATURE

*Life and Finite Individuality. Two Symposia:* I. By J. S. HALDANE, D'ARCY WENTWORTH THOMPSON, P. CHALMERS MITCHELL, and L. T. HOBHOUSE. II. By BERNARD BOSANQUET, A. S. PRINGLE-PATTISON, G. F. STOUT, and VISCOUNT HALDANE. Edited for the Aristotelian Society with introduction by H. Wildon Carr. London: Williams and Norgate. 1918. Pp. 194.

"The purpose of the Aristotelian Society Symposium is to bring together opposite, divergent, and diverse answers to some vital question of philosophical controversy in a definite manner" (Introduction, p. 5); and these Symposia have certainly accomplished that purpose.

<sup>3</sup> This solution was once suggested to me by Professor E. A. Singer, Jr., who now allows me to publish it as a reply.